

Above-Knee Prosthesis With Variable Resistance Knee Joint

Abstract

An above-knee prosthesis that allows the user to control the resistance of knee flexion or extension, and to voluntarily lock and release the knee joint, at any and all bending angles, comprising a thigh frame assembly that receives a thigh stump; a leg frame assembly with foot attached; a hinge interconnecting the thigh frame and leg frame assemblies to form an artificial knee joint; a closed hydraulic system further interconnecting the thigh frame and leg frame assemblies to provide resistance to the bending of said artificial knee joint, a means to vary the resistance provided by said closed hydraulic system, and a means to translate the AP movement of said thigh stump into the degree of resistance provided by said closed hydraulic system. In its preferred embodiments, the AP movement of the thigh stump is communicated by means of a linkage, sliding or screw assembly, to a flow rate control valve. The flow rate control valve varies the amount of the resistance provided by the closed hydraulic system controlling, thereby, the amount of resistance within the artificial knee. Pressing the thigh stump backwards within the thigh frame assembly increases the resistance within the hydraulic system and slows knee bending until the knee locks. Pressing the thigh stump forward decreases the hydraulic resistive force and allows the artificial knee joint to yield to outside forces, such as gravity and/or stump thrust, until the prosthesis rotates freely about the knee hinge. The

above-knee prosthetic prevents the knee joint from giving way, promotes a balanced stance, and facilitates a near normal reciprocating gait while ascending and descending stairs and slopes.